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ABSTRACT

An overview of recent progress in France in physics of excimer lasers and applications of this class of lasers is presented. Particular focus is made on work made in the frame of Eureka Eurolaser Excimer laser program (EU 205). This program, which started in 1987, associates laboratories and industrials from 5 european contries (France, Greece, RFA, Sueden and UK) for research and development on discharge excited excimer lasers and specific applications with the goal to develop a 1-3 KW average power UV industrial excoimer laser. This programm as very recently allowed the achievement in France of a 1 KW average power XeCl laser ($\lambda=308$ nm). Most recent progress achleved on this program in the frame of GDR 919 CNRS "excimer lasers" are reviewed. Emphasis ls made on plasma dynamics and discharge stability, atomic and molecular kinetics, laser modeling, optics, fluid-dynamics and coupled phenomena as well as system technical characteristics and performances.

A review of recent work made at GDR 919 CNRS on specific applications of high average power excimer lasers is also presented with a particular focus on material processing (surface hardening, thin films elaboration, microelectronics related processing). The physico-chemical processes inside the plasma plume during thin film elaboration is described in details.

At last, a short description is made of researchs on new methods of rare gas halide excimer lasers pumping and new promising excimer lasers shemes including active medium excitation by uncoherent light from a sliding discharge on formed ferrite and ionic excimers VUV lasers potentialities.